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so they are and have been for some years printed in this magazine, although we should prefer to follow the rules of English grammar, and the usage of botanists.

The latest abomination is that practiced by some entomologists in lists and catalogues, who begin all specific names with a capital. Now in the name of Linnæus and Lindley Murray combined, let us pause here. No well educated and sane person writes *john smith's Book* or *john Smith's Book*, but *John Smith's book*.

Can any one give us any good reason for not following the ordinary usage and writing the name of our common butterfly *Papilio Turnus*, the specific name being a proper one, rather than *papilio turnus* or *papilio Turnus*? or worst of all write the scientific name of the robin *Turdus Migratorius*.

Nomenclatural excesses or absurdities, trivial technicalities, in season and out of season, are the bane of modern biology, and we are glad that a natural disgust for these disagreeable concomitants of the study of living nature, tends to lead enthusiastic naturalists to eschew systematic biology, dried plants, dried skins and dried beetles, and to seek the woods and fields and observe the habits and instincts of living animals, or to undertake the more difficult and disciplinary anatomical and embryological fields of research.

Another argument is the increasing attention to be given hereafter in public schools to the study of biology. Botanists and zoölogists who write text books should bear in mind that a uniform nomenclature is of particular importance. Confusion and disgust should not result from the study of nature. What theologians are pleased to call the "natural" man rightfully rebels against an overstrung nomenclature. The biologico-pedagogical pill should be sugar-coated, or at least have no projecting angles.

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RECENT LITERATURE.

WEISMANN'S STUDIES IN THE THEORY OF DESCENT.[1]—Next to the works of Darwin, Wallace and Fritz Müller, the present essay of Weismann's, which appeared in Germany several years since, is perhaps the most important contribution to the doctrine of evolution, and its appearance in an English dress, revised and annotated, should cause it to be widely read. The author's object was both philosophical and purely scientific. Besides endeavoring to test the capabilities of the known factors of transformation, the author discusses a question of wider importance,

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[1] *Studies in the Theory of Descent.* By Dr. AUGUST WEISMANN. With notes and additions by the author. Translated and edited, with notes, by RAPHAEL MELDOLA. With a prefatory notice by CHARLES DARWIN. In 2 vols., with 8 colored plates. London, Sampson Low, Marston, Searle & Rivington, 1882. 8vo, pp. 729.

e., whether there exists a special " developmental force." This he believes cannot be decided by mere speculation, " it must also be attempted to approach it by the inductive method." While Weismann makes use of Darwin's principle of natural selection, he also accepts " the transforming influence of direct action, as upheld by Lamarck," although he adds, " its extent cannot as yet be estimated with any certainty."

The work consists of five essays. The first is on the " seasonal dimorphism of butterflies," in which the author attempts to discover the causes of this remarkable dimorphism, and by this means to indicate at the same time the extent of one of the transforming factors with reference to a definite case. How stimulating the facts and results given in this chapter are to entomologists, whether they are interested in the philosophic bearings of the fact or not, is well known; new and suggestive lines of research have been opened by the author, and in this country carried on by Mr. W. H. Edwards.

Weismann concludes from his studies in seasonal dimorphism, "that differences of specific value can originate through the direct action of external conditions of life only." He has certainly proved that new species arise by differences in climate, while he also (in a note to the English edition) concedes that sexual selection plays a very important part in the markings and coloring of butterflies, but he significantly adds, "that a change produced directly by climate may be still further increased by sexual selection."

A second point, and one of particular interest, which the author claims to be elucidated by seasonal dimorphism, is " the origin of variability." Having shown that " secondary forms are for the most part considerably more variable than primary forms," it follows that " similar external influences either induce different changes in the different individuals of a species, or else change all individuals in the same manner, variability arising only from the unequal time in which the individuals are exposed to the external influence. The latter is undoubtedly the case, as appears from the differences which are shown by the various individuals of a secondary form. These are," he adds, giving his proofs, " always only differences of degree and not of kind." He shows that allied species and genera, and even entire families (Pieridæ), "are changed by similar external inducing causes in the same manner, or better, in the same direction." He then concludes:

"In accordance with these facts the law may be stated, that in butterflies, at least, all the individuals of a species respond to the same external influences by similar changes, and that, consequently, the changes brought about by climatic influences take a fixed direction, determined by the physical constitution of the species. When, however, new climatic forms of butterflies, in which natural selection is completely excluded, and the nature of the species itself definitely determines the direction of the changes, nevertheless show variability from the very beginning, we may venture to conclude that every transformation of a species generally begins with a fluctuation of its characters. But when we find the primary forms of butterflies always far more constant, this shows that the continued crossing of the individuals of a species to a certain extent balances the fluctuations of form. Both facts taken together confirm the law formerly enunciated by me,[1] that in every species a period of variability alternates with one of (relative) constancy—the latter indicating the culmination, and the former the beginning or end of its development."

He therefore formulates the chief results of his investigations thus: "A species is only caused to change through the influence of changing external conditions of life, this change being in a fixed direction which entirely depends on the physical nature of the varying organism, and is different in different species or even in the two sexes of the same species."

Weismann insists that too little is ascribed to the part played by the physical constitution of species in the history of their transformation, when the course of this transformation is attributed entirely to external conditions. "Darwin certainly admits the importance of this factor, but only so far as it concerns the individual variation, the nature of which appears to him to depend on the physical constitution of the species. I believe, however, that in this directive influence lies the precise reason why, under the most favorable external circumstances, a bird can never become transformed into a mammal, or to express myself generally, why, from a given starting point, the development of a particular species cannot now attain, even under the most favorable external conditions, any desired goal; and why, from this starting-point, given courses of development, even when of considerable latitude, must be restricted, just as a ball rolling down a hill is diverted by a fixed obstacle in a direction determined by the position of the latter, and depending on the direction of motion and the velocity at the moment of being diverted." Finally, he remarks: "If, under heredity, we comprise the totality of inheritance, that is to say, the physicial constitution of a species at any time, and therefore the restricted and, in the foregoing sense, predetermined power of variation, whilst under 'adaptation,' we comprehend the direct and indirect response of this physical constitution to the changes in the conditions of life. I can agree with Haeckel's mode of expression, and with him trace the transformation of species to the two factors of heredity and adaptation." It will be difficult to prove that the views here given are not impregnable, and that future advances in biology will not prove that external changes in the environment and heredity, are not the two fundamental factors in the origin of life-forms; natural and sexual selection playing a subordinate rôle, and rather preserving forms already originated than bringing about new biological creations.

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[1] "See my essay, Ueber den Einfluss der Isolirung auf die Artbildung. Leipzig, 1872."

The second part opens with a discussion of the origin of the markings of caterpillars, based on a knowledge of the early stages of the Sphingidæ, which the author's industry has almost alone furnished. His results certainly seem correct, and we think analogous though far less numerous facts concerning other groups of caterpillars, as well as saw-flies larvæ, which we have observed, will confirm Weismann's views. His evidence shows that there were once Sphinx larvæ without any markings, but with a caudal horn, as such a species now exists in the Berlin Museum. The characteristic caudal horn is older than existing markings. All the data go to show that of the three kinds of markings, *i. e.*, longitudinal and oblique stripes and spots, the first are the oldest, and of the longitudinal stripes the sub-dorsal originated before the dorsal and spiracular. The question as to the relative ages of the oblique lines and the spots does not admit of a general answer. The lines and spots are believed to have originated by the known factors of natural selection and "correlation" (Darwin), protective mimicry here acting as one of the factors of natural selection, the spots being of advantage to the larvæ.

The second section of this part is on phyletic parallelism in metamorphic species. The author attempts to show that the form-relationship of larvæ, especially caterpillars, does not always coincide with that of the imagines, or, in other words, a system based entirely on the morphology of the larvæ does not always coincide with that founded entirely on the morphology of the imagines. Space will not permit us to give an analysis of this section. Weismann here also is emphatic in stating that the external conditions of life produce the transformations and induce the organism to change. It seems to him "incomprehensible how one and the same vital force can in the same individual induce one stage to become transformed feebly and the other stage strongly, these transformations corresponding in extent with the stronger or weaker deviations in the conditions of life to which the organism is exposed in the two stages, to say nothing of the fact that by such unequal divergences the idea of a perfect system (creative thought) is completely upset."

The facts stated by the author in the third part relative to the metamorphosis of Siredon into Amblystoma are well known, as also his view, which we should question, that the Amblystomas which have been developed in captivity from *Siredon mexicanus* are not progressive but reversional forms. This view appears to us to be untenable, and not in accord with the metamorphosis of salamanders and even of Amblystoma in general. This chapter is largely theoretical, and we doubt if the author's conclusions as to the reversion and causes of reversion can be proved, especially since the climate in Utah, where adult Siredons abound, is as dry as in Mexico.

In the fourth and last section of this part, while denying the existence of a "phyletic vital force," Weismann claims that while the processes and results of evolution are mechanical, and there is no *interference* of a directive teleological power in the processes of the universe, yet that in the beginning there was "an *appointment* of the forces producing them;" that the whole course of nature points back to a first Cause, a Creator; that mechanism and teleology do not exclude one another, but that there is a purpose in nature.

We take it that Weismann has been the first naturalist to show very plainly and simply, and by use of the inductive as well as deductive processes of thought, that teleology is not only possible but most probable. It seems to us he has afforded the clearest argument yet presented by an evolutionist for the existence of a First Cause. Hence materialism and teleology are opposite poles of the same truth. Weismann remarks: "I believe that I have shown that the theory of selection by no means leads—as is always assumed—to the denial of a teleological Universal Cause and to materialism, and I thereby hope that I have cleared the way for this doctrine, the importance of which it is scarcely possible to over estimate. Many, and not the most ill-informed, do not get so far as to make an unbiased examination in the facts, because they are at the outset alarmed by the to them inevitable consequence of the materialistic conception of the universe. Mechanism and teleology do not exclude one another, they are rather in mutual agreement. Without teleology there would be no mechanism, but only a confusion of crude forces; and without mechanism there would no teleology, for how could the latter otherwise effect its purpose?" Our author closes this admirable work with the following words: "The final and main result of this essay will thus be found in the attempted demonstration that the mechanical conception of nature very well admits of being united with a teleological conception of the universe."

MAYNARD'S MANUAL OF TAXIDERMY.[1]—The author of "The Naturalist's Guide" has, in this new venture, done a service to young ornithologists, and judging by the appreciation in which the present book is held by our son, a boy of eleven, who finds it to be a clear, intelligible and sufficiently brief description how to skin and stuff a bird, we have no doubt but that the book is what is required. Indeed the author has purposely avoided

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[1] *Manual of Taxidermy.* A complete guide in collecting and preserving Birds and Mammals. By C. J. MAYNARD. Illustrated. Boston, S. E. Cassino & Co., 1883. 12mo, pp. 111.